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A.D. 1870, 26th NOVEMBER. N° 3107.

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SPECIFICATION

OF

JOSEPH BRYANT & SAMUEL HALL CULLEY.

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FOR IMPROVING AND TREATING SEWAGE, &c.

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A.D. 1870, 26th NOVEMBER. N° 3107.

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**Deodorizing and Treating Sewage, &c.**

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**LETTERS PATENT** to Amos Bryant, of Heavitree Road, Exeter, and Samuel Hall Culley, of Saint Sidwell's Cottage, in the City of Exeter, both in the County of Devon, for the Invention of "**IMPROVEMENTS IN DEODORIZING AND TREATING SEWAGE, AND IN APPARATUS TO BE EMPLOYED FOR THIS PURPOSE.**"

Sealed the 2nd May 1871, and dated the 26th November 1870.

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**PROVISIONAL SPECIFICATION** left by the said Amos Bryant and Samuel Hall Culley at the Office of the Commissioners of Patents, with their Petition, on the 26th November 1870.

We, AMOS BRYANT, of Heavitree Road, Exeter, and SAMUEL HALL  
5 CULLEY, of Saint Sidwell's Cottage, in the City of Exeter, both in the  
County of Devon, do hereby declare the nature of the said Invention  
for "**IMPROVEMENTS IN DEODORIZING AND TREATING SEWAGE, AND IN APPARATUS  
TO BE EMPLOYED FOR THIS PURPOSE,**" to be as follows:—

This Invention has for its object improvements in deodorizing and  
10 treating sewage, and in apparatus to be employed for this purpose.



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*Bryant & Culley's Impts. in Deodorizing and Treating Sewage, &c.*

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To deodorize and purify sewage we add to it deodorizing materials, and cause it to pass into catch pits and through gratings to separate the greater part of the solids from it. Afterwards it is passed through a series of filters of various materials until the effluent water is purified to the extent desired. The residue obtained in the catch pits and filters is 5 subsequently manufactured into manure as herein-after explained. For these purposes we form at the end of a sewer (or conduit down which sewage is passed) branch passages leading to settling boxes or chambers, and the sewage is allowed to flow into any one or other of these settling chambers by raising suitable sluice valves, or can be shut off therefrom 10 to allow of the settling chambers being emptied. From each settling chamber the sewage flows through gratings to another settling chamber, and again passes through a still finer grating and escapes into an intercepting conduit or sewer. This intercepting conduit or sewer is of any convenient length to enable the sewage received in it to be distributed 15 to any required number of sets of filters. The flow of sewage from the intercepting sewer to each set of filters is governed by sluice valves. Before the sewage is allowed to enter the settling beds before mentioned it is passed over a weir and catch pit to separate the larger solids from it, and afterwards lime water, carbolic acid, or tar water, or other deo- 20 doring material is added to the sewage previous to its entering the settling beds. In these beds a great part of the solid matter in the sewage is deposited, and the sewage is comparatively pure before it enters the intercepting sewer or conduit and is allowed to pass to the filter beds. The sewage from the intercepting sewer is caused to pass 25 in succession through several filters; it is by preference first caused to enter a filtering chamber, from which it passes through filtering material at its end, and enters a second filtering chamber, from the bottom of which it escapes through filtering material, and is subsequently caused to rise up into a third chamber through filtering material, and so on 30 through as many filters as desired, being alternately caused to filter upwards and downwards, in order that the last filtering chamber need not be at a much lower level than the inlet sewer or conduit of the apparatus. The several filtering chambers are each lined with a box fitted with gratings between which the filtering material is placed; 35 these boxes can be lifted out whenever required, and emptied and replenished with new filtering material. The settling chambers are also similarly lined with boxes which can be lifted out for the purpose of emptying them. The purified effluent water from the last filters may



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be conducted away by any suitable channel. The space between the gratings of each filter we fill in with one or other of the following materials:—Limestone chippings, cinders, sawdust, dry horse dung, alum, charcoal from marine plants, wood charcoal, sponge, ground flint, sulphur, or common earth. The sewage may be caused to pass in succession through filters of each or some only of these materials. In the first settling chamber we also add to the sewage quicklime and salt dropped in at short intervals, and at a further stage of the process we add to the sewage sulphuric acid, sulphate of iron, shale oil, or petroleum. When the boxes of the settling and filtering chambers are emptied the materials emptied out from them are mixed together, and quicklime, soot, salt, and soda are also added. The apparatus is covered over with a roof or roofs, and any foul gases arising are led off by suitable pipes through fires or through heated pipes or passages.

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15 SPECIFICATION in pursuance of the conditions of the Letters Patent, filed by the said Amos Bryant and Samuel Hall Culley in the Great Seal Patent Office on the 26th May 1871.

TO ALL TO WHOM THESE PRESENTS SHALL COME, we, AMOS BRYANT, of Heavitree Road, Exeter, and SAMUEL HALL CULLEY, of Saint Sidwell's Cottage, in the City of Exeter, both in the County of Devon, send greeting.

WHEREAS Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Twenty-sixth day of November, in the year of our Lord One thousand eight hundred and seventy, in the thirty-fourth year of Her reign, did, for Herself, Her heirs and successors, give and grant unto us, the said Amos Bryant and Samuel Hall Culley, Her special license that we, the said Amos Bryant and Samuel Hall Culley, our executors, administrators, and assigns, or such others as we, the said Amos Bryant and Samuel Hall Culley, our executors, administrators, and assigns, should at any time agree with, and no others, from time to time and at all times thereafter during the term therein expressed, should and lawfully might make, use, exercise, and vend, within the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, an Invention for "IMPROVEMENTS IN DEODORIZING AND TREATING SEWAGE, AND IN APPARATUS TO BE EMPLOYED FOR THIS PURPOSE,"



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upon the condition (amongst others) that we, the said Amos Bryant and Samuel Hall Culley, our executors or administrators, by an instrument in writing under our or their hands and seals, or under the hand and seal of one of us or them, should particularly describe and ascertain the nature of the said Invention, and in what manner the same was 5 to be performed, and cause the same to be filed in the Great Seal Patent Office within six calendar months next and immediately after the date of the said Letters Patent.

**NOW KNOW YE**, that I, the said Samuel Hall Culley, on behalf of myself and the said Amos Bryant, do hereby declare the nature of the 10 said Invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement thereof, that is to say :—

To deodorize and purify sewage we cause it to pass into catch pits or settling beds to separate the greater part of the solids from it, having 15 previously added to it deodorizing materials, such, for example, as carbolic acid, as has before been proposed. Afterwards the sewage flowing off from the catch pits or settling beds is caused to filter through sawdust, or it might be through filters of sawdust, which by preference is charred, and other materials until the effluent waters are purified to 20 the extent desired. The sawdust after being so used as a filtering material is allowed to dry, and is subsequently mixed with the sediment collected in the catch pits or settling beds. The sediment is by preference allowed to drain, or is partially dried by spreading it out in thin layers on suitable drying floors. A layer of the dry or charred sawdust 25 is spread out on to a suitable floor, and the sediment from the catch pits or settling beds is thrown over it, and then another layer of sawdust is thrown over the sediment. The whole is mixed together by means of shovels, and by reason of the drying nature of the sawdust the mass quickly dries and is readily pulverized. Afterwards the dried material 30 is sifted to separate all lumps from it, and these lumps are again still further dried, reduced to powder and sifted, and thus the whole of the residue from the catch pits or settling beds can for the most part be dried and reduced to powder. In cases where it is not essential to filter the waters which flow off from the catch pits or settling beds, and where 35 such waters may be allowed to flow off in a comparatively impure state, the filtering of these waters through the sawdust previous to the sawdust being mixed with the sediment obtained in the catch pits or settling



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beds may be dispensed with, and the sawdust without having been used as a filtering material may be used for mixing with the sediment for the purpose of drying and to prevent effluvia rising from it. In addition to adding sawdust to the sediment obtained in the catch pits or settling  
5 beds sulphuric acid, sulphate of iron, gypsum, marine charcoal, and other materials of a drying and deodorizing nature may be added to it previous to its being finally dried and sifted. Any one or more of the following ingredients may be added to it if desired after it has been sifted to add to its value as a manure:—Bone sweepings, bone dust,  
10 horn pith ground, sea sand, chimney soot, pyrites, phosphate of alumina, fenugreek, manganese, sulphate of lime, soda wood, charcoal, petroleum, wood ashes, coal ashes, and cinders whole and ground.

Having thus described the nature of our Invention, and the manner in which we prefer to perform the same, we would have it understood  
15 that what we claim is, the process substantially as herein described for deodorizing and treating sewage.

In witness whereof, I, the said Samuel Hall Culley, have hereunto set my hand and seal, this 26th day of May, in the year of our Lord 1871.

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S. H. CULLEY. (L.S.)

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LONDON :

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